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AGRICULTURAL DRAINWATER MANAGEMENT ORGANIZATIONS

in the

DRAINAGE PROBLEM AREA of the GRASSLANDS AREA of the SAN JOAQUIN VALLEY

MARCH 1989

prepared
under contract
for the

FEDERAL-STATE
SAN JOAQUIN VALLEY
DRAINAGE PROGRAM

This report presents the results of a study conducted for the Federal-State Interagency San Joaquin Valley Drainage Program. The purpose of the report is to provide the Drainage Program agencies with information for consideration in developing alternatives for agricultural drainage water management. Publication of any findings or recommendations in this report should not be construed as representing the concurrence of the Program agencies. Also, mention of trade names or commercial products does not constitute agency endorsement or recommendation.

The San Joaquin Valley Drainage Program was established in mid-1984 as a cooperative effort of the U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Geological Survey, California Department of Fish and Game, and California Department of Water Resources. The purposes of the Program are to investigate the problems associated with the drainage of irrigated agricultural lands in the San Joaquin Valley and to formulate, evaluate, and recommend alternatives for the immediate and long-term management of those problems. Consistent with these purposes, Program objectives address the following key areas: (1) Public health, (2) surface- and ground-water resources, (3) agricultural productivity, and (4) fish and wildlife resources.

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EXECUTIVE SUMMARY

Policies to resolve westside agricultural drainage-related problems must be adopted by agricultural water managers in order to accomplish policy goals and objectives. To be effective, planning to develop and implement new water policies must first identify who is responsible for making water-use decisions and the organizational context of the decision-making process. The San Joaquin Valley Drainage Program's Agricultural Water Management Subcommittee has concluded that the socio-economic circumstances surrounding on-farm irrigation and drainage water management practices are an important determinant of drainage-related problems on the west side of the San Joaquin Valley (1987). According to the Subcommittee, reducing agricultural drainage volume and drainage load to manageble proportions will require the modification of existing institutional arrangements and economic incentives.

Because westside water users rely upon cooperative arrangements with others in managing agricultural water use, decisions to alter water use practices are not wholly individual decisions. In the Drainage Problem Area of the San Joaquin Valley, drainwater production and disposal can be seen as the product of the collective activity of cooperating agricultural water users. This paper is the first of a series of institutional studies which will describe the structure of regional agricultural water organizations, both formal and informal, in order to determine whether and to what extent water policy proposals need to be addressed to individual on-farm water users or to agricultural water management organizations. These studies will also identify existing organizations that may be used to increase the effectiveness of policy proposals, diminish uncertainty regarding the probable effectiveness of plan proposals, and enhance the likelihood of high acceptability for plan proposals.

Key Findings:

- A variety of special district forms under existing California law may provide for the administration of local agricultural water resources. California water districts, irrigation districts, drainage districts and resource conservation districts are the four main types of special districts that currently provide most of the formal organizational framework for local drainage water administration in the drainage problem area.

- Under existing California law, the incorporation, modification, or dissolution of a special district requires ratification by local contituencies and approval by the county's board of supervisors and Local Agency Formation Commission (LAFCO).

- Alteration of existing districts or incorporation of new special districts to restructure administrative authority and accountability for agricultural drainwater monitoring and management will require a special act of the state legislature if local water users oppose this action.

- Currently, individual water utility districts cooperate to monitor and manage agricultural drainwater in the drainage problem area. With the exception of the resource conservation district form, a new special district to manage drainage problems could be superimposed on existing district boundaries, even if the new district were incorporated as the same type of district.

- The organization of regional agricultural drainwater management in the drainage problem area is best understood as a system in which formal organizations fall into distinct, interdependent catagories, depending upon their specialized role in regional drainwater generation, use and management. The three functional roles in the organization of problem area drainwater management are draining entity, drainwater conveying entity, and drainwater receiving entity.

- Drainwater management in the drainage problem area is based on both formal and informal arrangements, which shape and organize water use decisions by individual water users, water managers and special districts. Therefore, the analysis of agricultural drainwater management in the problem area cannot be restricted to an examination of formal institutions and organizations (e.g. special districts, laws, contracts, water rights).

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INTRODUCTION

The San Joaquin Valley Drainage Program is engaged in a comprehensive effort to answer questions relating to agricultural drainage issues and to develop proposals for managing drainage-related problems among recreational, agricultural, and wetland water users. One facet of this effort is an analysis of the organization of agricultural water management on the westside of the San Joaquin Valley. As part of the social analysis, this study focuses on the administrative role played by local agricultural water utilities and organizations. This paper identifies institutional features of westside agricultural drainwater management and describes the social-structural dimensions of agricultural drainwater management utilities in an important drainage problem area of the western San Joaquin Valley.

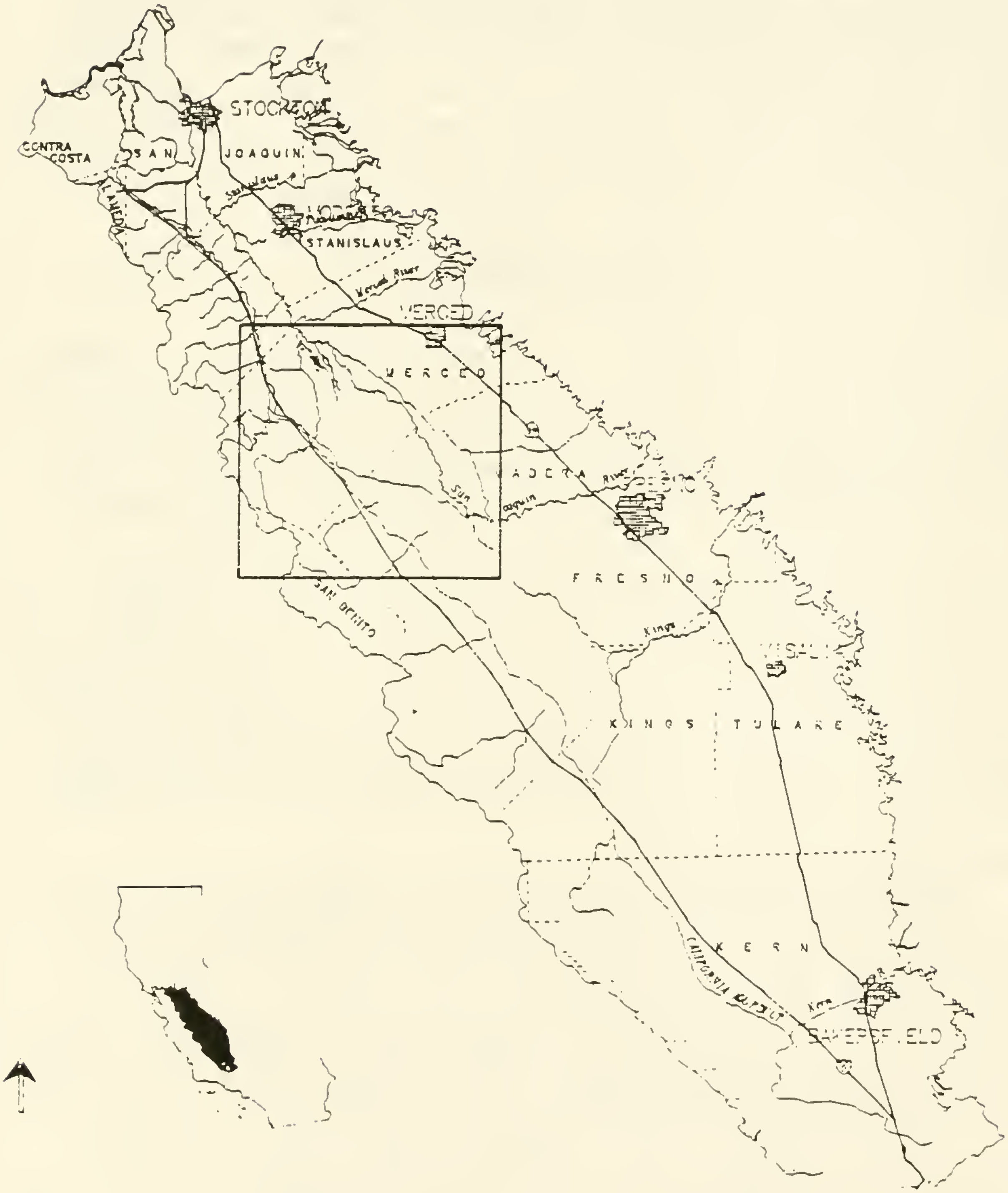
The general area of concern for this report is bounded on the north by the Stanislaus County line, on the east by the San Joaquin River, on the south by the northern boundary of the Westlands Water District, and on the west by the western boundaries of the Mustang, Landsdale, Quinto, Centinella, Romero, and San Luis Water Districts. These boundaries encompass a region commonly know as "the grasslands" (see figure 1). The lower elevations of the grasslands are a natural drainage sink within the San Joaquin River Basin. Wetlands lie at the bottom of the sink, towards which much of the water in the region naturally flows. This flow ties the wetland's water supply and water quality situation directly to the irrigation and drainage practices of upslope water users. It is within this general area that drainage problems among agricultural, recreational, and wetland habitat water users are most acute.

FOCUS ON WATER UTILITY DISTRICTS

Responsibility for water use policy, planning and day-to-day activities in the grasslands is dispersed among a large number of public and private water managers. Public water administration is provided by 17 California water districts, one county water district, one irrigation district, five drainage districts, one levee district, eight resource conservation districts, Fresno and Merced County governments, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the California State Water Resources Control Board, the Central Valley Water Quality Control Board, the State Department of Water Resources, the U.S. Bureau of Reclamation, the U.S. Army

General Location of the **Drainage Problem** Area

Figure #1



Corps of Engineers, and water utilities serving the communities of Los Banos, Dos Palos, Gustine and Firebaugh. Private water management is provided by voluntary associations, non-profit canal companies, land companies, hunting clubs, agricultural corporations, family farmers, and individual water users.

In the grasslands, special districts that provide water services serve as a focal point for agricultural water planning, policy, and day-to-day management. Special districts are local government subdivisions of the State of California that are neither cities, counties, nor school districts. According to the California State Controller (1987), special districts are utilized on a wider scale in California than anywhere else in the nation; in the 1985-1986 fiscal year, there were 5,053 special districts incorporated in California under 204 different statutory authorizations. Within the grasslands, six different types of special district are incorporated into more than 30 separate water utilities (see Table 1). These water utility districts administer local agricultural water utility services and provide important organizational linkages among water users and other governmental entities in the region.

DRAINAGE PROBLEM AREA

The organization of agricultural water management in the grasslands is highly complex. However, agricultural drainage problems are concentrated in particular areas, creating problems that affect irrigated agriculture and water management practices in some districts more than others (State of California, 1987). Water utility districts responsible for water management in these problem areas have taken an active role in formulating policies to address drainage-related issues. These districts cooperate with each other to provide water management and related services across district boundaries. Therefore, this report focuses on current relationships among cooperating water utility districts with central roles in managing drainage and drainage-related problems in the grasslands. These water utilities are the Central California Irrigation District, the Broadview, Pacheco and Grassland Water Districts, the Grassland Resource Conservation District, the Charleston and Panoche Drainage Districts, and the Firebaugh Canal Company (figure 2).

The Firebaugh Canal Company, incorporated as a non-profit mutual water company, is organizationally similar in many respects to a California water district. Because the company is now in the final stages of incorporating as

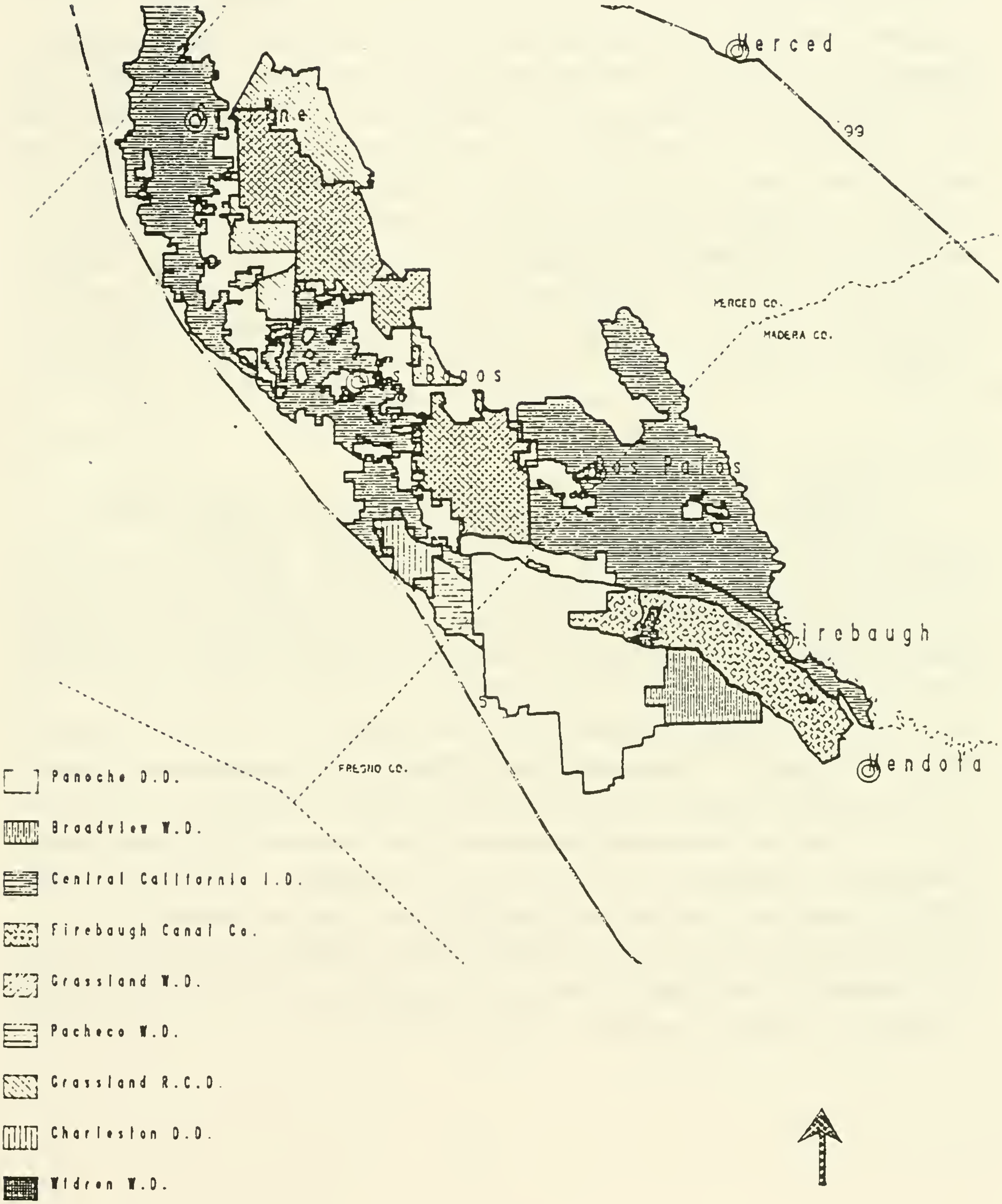
TABLE 1
AGRICULTURAL WATER UTILITY DISTRICTS IN THE GRASSLANDS

1. Broadview W.D.
2. Centinella W.D.
3. Central California I.D.
4. Charleston D.D.
5. Dos Palos D.D.
6. Eagle Field W.D.
7. Firebaugh Canal Co.
8. Firebaugh R.C.D.
9. Grassland R.C.D.
10. Grassland W.D.
11. Gustine D.D.
12. Gustine-Romero R.C.D.
13. Laguna W.D.
14. Landsdale W.D.
15. Los Banos R.C.D.
16. Lower San Joaquin L.D.
17. Mercy Springs W.D.
18. Mustang W.D.
19. Oro Loma W.D.
20. Pacheco W.D.
21. Panoche D.D.
22. Panoche R.C.D.
23. Poso R.C.D.
24. Panoche W.D.
25. Quinto W.D.
26. Romero W.D.
27. San Luis Canal Co.
28. San Luis R.C.D.
29. San Luis W.D.
30. Santa Nella C.W.D.
31. Santa Rita W.D.
32. Silver Creek D.D.
33. South Dos Palos C.W.D
34. Widren W.D.

C.W.D.	county water district
D.D.	drainage district
I.D.	irrigation district
L.D.	levee district
R.C.D.	resource conservation district
W.D.	California water district

Water Utility District Boundaries in the Drainage Problem Area

Figure #2



the Firebaugh Canal Water District, it is treated in this report as a California water district.

DATA SOURCES

Data for this study were derived from Federal Government and State of California records, federal, state and local government reports and other documents, the existing literature on the area and related issues, and field notes compiled from interviews with water managers responsible for local water administration within and adjacent to the drainage problem area. Twelve local water managers were interviewed, including members of the boards of directors of local water utility districts and canal companies, water utility managers, watermasters, and employees responsible for day-to-day operations. Interviews were structured to gain information about the organization of local water utilities, the water users they serve, day-to-day operations, organizational linkages to other water utilities, agencies and associations, and local perspectives on Problem Area agricultural drainage management problems.

ORGANIZATION OF THE REPORT

This report is organized into five sections. Section two presents information about the formal elements of agricultural drainwater administration in the Problem Area. A discussion of types of water utility districts by enabling act and special district regulation by local, state and federal agencies is included in this section. Section three of this report presents information about informal organizational characteristics of agricultural drainage management. The fourth section of this report describes the organization of interdependent agricultural water management entities in the Study Area. Section four explains how drainage producing, drainage receiving, and drainage conveying water utility districts are linked through interdependent interests in cooperative water management. The fifth section of this report explains the importance of an accurate and complete organizational analysis of agricultural water management in formulating plans that propose to alter agricultural water management practices in the drainage problem area of the grasslands.

FORMAL ORGANIZATION OF PROBLEM AREA WATER UTILITY DISTRICTS

The formal structure of an organization is its written blueprint for structuring and coordinating the collective action of its members into a unified whole. Typically, this includes an organizational chart of the elements of the organization- a listing of offices, departments, positions, and programs. The blueprint also includes explicit organizational goals and policies which comprise a justification for and explanation of how the elements of organization are to be linked to each other and to other individuals and organizations (Meyer and Rowan, 1977).

The local agricultural irrigation and drainwater management entities examined in this report are formally incorporated under California law into one of four distinct types of water utility district: California water districts, irrigation districts, drainage districts, and resource conservation districts.

INCORPORATION

The State of California specifies the purposes and procedures for incorporating special districts through general and special legislative enabling acts. General acts enable qualifying groups anywhere in the state to incorporate a local government to provide a limited range of services. Special acts provide only for the incorporation of a specified local government to provide special services to a particular area identified in the act.

Special districts are created by local constituencies for specific administrative purposes and have strictly limited powers. Special district incorporation of general district types must first be initiated by local residents or property owners, ratified by the proposed district's constituency, and then approved by the board of supervisors and local agency formation commission (LAFCO) of the county where the proposed district is located. Incorporation of a district under special enabling legislation is formally initiated by the State, but requires the same process of local ratification as district forms incorporated under general enabling acts.

POWERS

Water utility districts have substantially the same general powers as city and county governments. They commonly have autonomy and continuous corporate life, the ability to sue and be sued, the authority to exercise the right of eminent domain (except resource conservation districts), the right to acquire real and personal property, the authority to appoint and employ a workforce, the power to employ counsel, the right to enter into and perform contracts, and the power to tax. They are distinct from cities and counties in three basic ways. First, authority is limited to powers and activities specifically enumerated in the enabling statute. Second, police powers are limited to the use of district property and services; all special districts lack the power of general planning and land use control. Third, revenue raising options are mainly limited to three local sources-the ad valorem property tax (severely restricted since the passage of Proposition 13 in 1978), other special property-related assessments, and fees or user charges. Federal and state grants eligibility is limited to specific grants programs associated with a district's narrowly defined purpose (Sokolow, et al, 1981).

CALIFORNIA WATER DISTRICTS

A California water district must encompass contiguous or adjacent lands no more than two miles apart that are capable of using district supplied water for agricultural, domestic, industrial or municipal purposes, which can be serviced from a common source and a common delivery system. Water district lands may include the lands served by other districts, including other water districts, having different purposes. Improvement or distribution districts, subsets of the larger district, may be formed in order to provide services to and generate revenues for services from restricted areas of the district.

California water districts are governed by a five member board of directors when formed and may increase its board membership to seven, nine or eleven directors after four years. Each district choses between electing directors by division or at large. Qualified voters in district elections are holders of title (or evidence of title) and are allowed to cast one vote for each dollar of assessed value of their land (sec.35040 of the California Water Code provides for switching to resident voting under specified circumstances; none of the water districts in the Study Area have adopted registered resident voting requirements). This system of vote allocation allows district landowners to cast a proportion of votes equal to the proportion of the total value of land within the district that they own. District directors must be holders of title to land in the district, unless resident voting is adopted, in which case they must be registered residents, but need not be landowners.

California water districts are empowered to provide a broad range of additional services, including drainage and reclamation of agricultural lands.

IRRIGATION DISTRICTS

Irrigation districts are organized to furnish water for, and put water to, any beneficial use. Irrigation districts are empowered to serve land irrigable from a common water source and irrigation system, and may also decide to provide drainage services to district water users. District lands need not be contiguous, and may include residential and business users. New irrigation districts are prevented from incorporating land lying within another irrigation district unless they obtain consent of the pre-existing district's board of directors. Improvement or distribution districts, subsets of the larger district, may be formed in order to provide services to and generate revenues for services from restricted areas of the district.

The qualified voters of an irrigation district are the registered residents within the district's boundaries, who may cast one vote each. Each district decides upon representation by either a three or five member board of directors and whether to elect directors by divisions or at large. A director must be a voter, resident and freeholder of land within the district.

Irrigation districts are also empowered to allocate water according to crops and acreage in certain situations (Sec. 22252.3 of the California Water Code).

DRAINAGE DISTRICTS

Drainage districts in the Grassland Study Area are incorporated under the Drainge District Act of 1903. They are comprised of agricultural lands, other than swamp or overflowed lands, susceptable to a single mode of drainage by the same system of works. Their boundaries are prohibited from overlapping the boundaries of previously existing special districts without the other district's consent. Improvement districts, subsets of the larger district, may be formed in order to provide services to and generate revenues for services from restricted areas of the district. Drainage districts organized to provide subsurface drainage may adopt user fees for services or uniform assessments on land area to generate revenue for district operations.

District voters are land owners, who are allocated one vote per $100 of assessed valuation on the property they own within the district. This system of vote allocation allows district landowners to cast a proportion of votes equal to the proportion of the total value of land within the district that they own. Each district has wide latitude over the number of board members and over electing directors at large or by division; boards may be comprised of three, five or six directors elected by division, three or five directors elected at large, three directors elected by division plus three directors at large, five directors by elected division plus one director at large, or five directors elected by divisions plus three directors at large. District directors must be district electors and freeholders of land located within district boundaries.

RESOURCE CONSERVATION DISTRICTS

Resource conservation districts (formerly soil conservation districts) are formed in order to conserve water and soil, to develop and distribute water, and to improve the land's capabilities. Resource conservation districts may include public or privately owned agricultural or other lands, in one or more counties, that can be brought under the same general plan or system to accomplish district purposes. Their boundaries may not overlap the boundaries of other resource conservation districts. Improvement districts, subsets of the larger district, may be formed in order to provide services to and generate revenues for services from restricted areas of the district.

Voters are the district's registered residents, who may cast one vote each in elections for the district's five board members. Directors are elected at large, and must own land in the district or be the resident agent of a district landowner.

COMPARISON OF FORMAL ORGANIZATIONAL CHARACTERISTICS

Formal similarities and differences among principal types of Study Area water utility districts may be distinguished according to four basic institutional characteristics: (1) autonomy of governing board, (2) allocation of district voting power, (3) sources of revenues, and (4) principal purpose.

First, all of the entities under examination are independent local governments administered by boards of directors elected by qualified district voters. Although the definition of "qualified" and the criteria for distributing votes to the electorate varies by district, the board is formally independent of other local governments and is directly accountable to the voters of the district.

Second, problem area water utility districts may be differentiated according to the way votes are allocated. California water districts and drainage districts bias voting strength in district elections in favor of relatively large district landowners, and allow absentee owners to participate in district elections. Irrigation districts and resource conservation districts restrict the francise to one vote per district resident.

Third, districts vary by principal source of revenues. Irrigation and California water districts are enterprise districts. Enterprise districts derive most of their revenues from fees for services or benefits provided to individual users. Drainage and resource conservation districts are non-enterprise districts. In contrast to enterprise districts, they rely on revenues from general government funding, typically taxing everyone in the district at the same rate, regardless of differences in individual benefits.

Fourth, a distinguishing feature among these water utility districts is their primary purpose. Irrigation and California water districts are mainly empowered to acquire, develop, and distribute water for beneficial purposes to users within the district. Drainage districts are principally concerned with draining agricultural land. Resource conservation districts generally pursue the conservation and development of soil and water resources. However, in practice many of these goals are pursued in similar ways. Differences among district purposes may be blurred by the similarity of management strategies and the technologies districts employ. Additionally, enabling statutes often allow different types of districts to pursue related secondary purposes. All of the district forms under examination in this report are involved in irrigation or drainwater management, and all contribute to the formulation and implementation of agricultural water policies (see Table 2).

TABLE 2
GENERAL CHARACTERISTICS OF WATER UTILITY DISTRICT TYPES IN THE DRAINAGE PROBLEM AREA

TYPE	DISTRICT PURPOSES	REVENUE BASE	FRANCHISE BASE	CALIF. CODE	CODE SECTION
California Water Districts	Develop & distribute water; drain & reclaim irrigated lands served.	Enterprise: fees for service	Assessed value of land	Water	34000 et seq.
Irrigation Districts	Develop & distribute water; provide drainage; provide flood control, sewage & recreational services.	Enterprise:	Resident registered voters	Water	20500 et seq.
Drainage Districts; 1903 Act	Provide for drainage of agricultural lands.	Non-Enterprise: general government funds	Assessed value of land	Water Appendix	8-1
Resource Conservation Districts	Provide soil and water conservation; improve land; develop & distribute water.	Non-Enterprise: general government funds	Resident registered voters	Public Resources	9151 et seq.

WATER UTILITY DISTRICT REGULATORS

Local Agency Formation Commissions:

Legislation creating local agency formation commissions (LAFCOs) by the State of California in 1963 was an attempt to overcome problems associated with the organization and operation of the proliferating numbers and types of local governments in California. LAFCOs were formally created to "discourage urban sprawl and insure the orderly formation and development of cities and special districts." To this end, LAFCOs administer the formation or reorganization of special districts in California and provide county-wide planning guidance. Two members of each commission are chosen by the county board of supervisors, two by city councils, and one public member is chosen by the four appointed members. A commission may then decide to add one representative from each of two special districts within the county. Commissions exist in every California county except San Francisco.

LAFCOs control the formation or alteration of California's special districts in two ways. First, they review proposals for the incorporation, modification, or dissolution of municipal and special districts. LAFCO authority can deny, modify or request action on any proposal. There is no way for applicants to appeal adverse decisions short of a lawsuit. Second, LAFCOs determine spheres of influence of local governments. By specifying an existing or future entity's plan of intent and capability to provide public services to a particular area now or in the future, LAFCOs influence planning for the provision of public services within the county. Although LAFCOs have acquired a reputation for slowing down and confusing county and regional planning processes, they also present planners with opportunities to influence the area's local and regional governing organizations.

State and Federal Agencies:

The power and autonomy of water utility districts are constrained further by institutional linkages to state and federal governments and agencies. The State Department of Water Resources administers the State Water Project, contracts with local districts for the sale and delivery of water, and shares administrative responsibility with the State Water Commission for government loan and grant programs. The State Water Resources Control Board administers State water rights and water quality legislation, and oversees state and federal grants for waste treatment and water quality programs. The Office of the State Treasurer reviews district debt proposals, and the State Controller collects and publishes data on the financial transactions of special districts. The U.S. Bureau of Reclamation contracts with districts for the sale and delivery of water from the federal Central Valley Project, and administers loan programs in support of district irrigation and drainage systems (Goodall and Sullivan, 1979).

PROLIFERATION OF WATER UTILITY DISTRICT TYPES

Changes in the organization and purposes of water utility districts over the past 100 years reflect economic and social developments shaping the history of California water development. Reclamation districts were initially established in the 1860s to reclaim marshes and accomodate California's rapidly growing population. As agriculture became the leading economic activity in the 1880s, irrigation districts came to dominate the ranks of water utility districts. The increasing concentration of the state's population into urban areas after the turn of the century contributed to a shift toward more municipal control of water resources with the establishment of municipal and county water districts. After the First World War, concern over the efficient management of increasingly scarce water resources was reflected in empowering legislation which provided for integrating the power to administer water resources for irrigated agriculture with management for other beneficial uses of water. These trends were continued after the 1930s with provisions for broader powers for new district governments. Since the end of the Second World War, newly formed water utility districts have increasingly utilized property-weighted voting qualifications in district elections, reflecting the growing influence of agricultural corporations and absentee landowners (State of California, 1979).

INFORMAL ELEMENTS OF PROBLEM AREA DRAINWATER ADMINISTRATION

Organizations do not always function in strict conformity to their formal blueprints. Informal arrangements contribute to deviation from the prescriptions of formal structure and comprise an informal organizational structure that exists alongside the formal structure.

Informal arrangements may arise where elements of formal structure contradict each other, as when demands for operational efficiency conflict with the organization's structure of authority or the career interests of its officials. Or, organizational goals, policies and authority may be undefined or too abstractly defined to be objectively applied in everyday situations, contributing to an informal behind-the-scenes effort to get things done and an avoidance of close inspection, evaluation and control over others' activities (Meyer and Rowan, 1977). Management may depart from formal routines, formal rules and procedures may not be followed, and everyday activities may depart from the prescriptions of formal structure. Consequently, informal elements of the organization are crucially important to understanding and anticipating an organization's behavior.

Many aspects of local agricultural irrigation and drainage administration in the drainage problem area are of an informal nature. Informants for this study indicated that there are at least three important structural elements of informal drainwater administration in the Study Area: (1) informal ties between managers and water users within a district, (2) informal ties between managers and water users in different districts, (3) informal ties among area districts and district managers.

Water management within and between districts is highly influenced by personal relationships, and has developed into long-standing informal practices, understandings and expectations.

INFORMAL RELATIONSHIPS AMONG DISTRICT MANAGERS AND WATER USERS

Water utility district managers are formally charged with administering a district's water resources and conveyance facilities, and are formally accountable to the district board for implementing district policy. The responsibility for enforcing district policy, making decisions regarding water delivery schedules, the discharge of surplus water in a district's water delivery system, and control over at least some "operational spills" during normal operations provide district managers with a measure of influence in their dealings with water users, both within and adjacent to a district's boundaries. However, a manager's administrative discretion can be at the same time a source of vulnerability. District board directors are usually busy farmers with limited time and energy to devote to the day-to-day affairs of the district. Managers who fail to solve operational problems or generate conflicts with individual water users, other districts or outside organizations may force the board to expend additional time, effort and district funds to settle the district's affairs. Local water user demands may complicate or conflict with a manager's attempts to realize district policy or to honor informal agreements. Actual water management practices are frequently negotiated settlements among actors who must cooperate with each other over extended periods of time.

Formal ties among Problem Area water managers are typically structured through contractural agreements. Irrigation and drainwater conveyance services, drainwater discharge arrangements, and construction and maintenance services are often written out in contractual form. However, actual exchanges of resources and services frequently depart from the formal provisions of contractual relations. Informal exchanges over the last decade are likely to involve managerial cooperation in areas where managers lack formal authority, but where cooperation is important to managerial effectiveness. Because water conveyance technology does not allow for precise measurement and control, state, federal and local water administrators may actually deliver a larger or smaller volume of water than water contracts stipulate; or, water volume or water quality standards for drainwater received may exceed contractual agreements. Occasionally, small maintenance and construction services are provided to neighboring districts for a small fee. Informal arrangements such as these are generally seen by area water managers and water users as essential to effectively managing the day-to-day affairs of a district. Exchange of favors by district managers for personal gain is widely condemned and avoided.

INFORMAL ARRANGEMENTS AMONG DISTRICTS

In 1866, the San Joaquin and Kings River Irrigation and Canal Company began building the extensive system of canals that brought large scale irrigated agriculture to the grasslands. The company was initially a partnership between a group of San Francisco speculators and Henry Miller, who owned most of the riparian water rights and irrigable land in the grasslands at that time. Within thirty years, Miller owned a controlling interest in the company. By diverting water from the San Joaquin River to irrigate his lands west of the river, Miller was able to establish appropriative water rights for his non-riparian land. Miller's ownership and control over the land, water and water distribution facilities in the grasslands was almost absolute by the turn of the century, and he utilized many legal and political strategies to maintain his property interests. One of the principal strategems Miller relied upon at the local level was to tie his neighbors' economic welfare to his right to continue managing his property unhindered.

Henry Miller managed his property in a way that accomodated his neighbors' economic interests whenever possible, even though this frequently prevented him from maximizing profits by exploiting his control over so much of the area's agricultural resources. Neighbors whose welfare was enhanced by Miller's administrative autonomy over the bulk of the area's water resources rarely challenged his continuing right of control. Miller maintained that his interests were best served in the long run by minimizing jealosy and charges of exploitation that could lead to political action to diminish his control (Treadwell, 1981).

After Miller's death in 1916, most of the land held by the Miller and Lux Corporation was sold. The Firebaugh Canal Company, the San Luis Canal Company, the Columbia Canal Company (located east of the San Joaquin River) and the San Joaquin and Kings River Irrigation and Canal Company (The Central California Irrigation District today), were originally acquired or incorporated as subsidiaries of the Miller and Lux Corporation to wheel water to its lands in and around the area with riparian and appropriative water rights. Known locally as the "Four Entities," these water utilities retained Miller's "good neighbor" operational policy, managing their distribution facilities and surplus waters in ways that accomodated their neighbors' economic interests whenever possible. Over time, this general ethic has developed into one of the most important informal conventions in water management in the grasslands, the "good neighbor" rule.

The "good neighbor" rule directs adherents to extend help to other "good neighbors" without exploiting an advantageous position. The development of this principal has both reflected and encouraged the development of interdependencies among agricultural water users, managers, and utility districts. As a result, water users in the area often find that cooperation rather than competition is in their best interests

INTERDEPENDENCIES IN AGRICULTURAL WATER MANAGEMENT

The current organization of agricultural drainwater administration in the drainage problem area is not the consequence of an intentional, comprehensive plan for the area's development. Instead, organizational features evolved gradually over a period of many decades in response to changing circumstances. An understanding of the history of grassland area water development and water management is necessary to understand the present situation.

HISTORICAL CONTEXT

Grassland area wetlands are an important link in the Pacific Flyway, providing a crucial wintering habitat for migratory waterfowl. The area gradually developed into one of California's most important waterfowl habitats, partly as an unintented byproduct of efforts begun in the 1860s to establish large-scale cattle operations. The Miller and Lux Corporation, original owner of much of the land in the grassland area, helped to build an extensive system of canals to divert water from the San Joaquin River to flood pastures and irrigate fields of alfalfa in support of its cattle ranching operations. Irrigation water drained away from pasture and crop land into nearby sloughs and ponds. These practices created much of the region's wetland habitat as agricultural development elsewhere destroyed Tulare Lake and other natural San Joaquin Valley wetlands (Jones, et al, 1947). As valley waterfowl became increasingly dependent upon and concentrated in the grasslands, sportsmen, attracted by the area's bird population, established gun and duck clubs for recreational use. Hunting was further encouraged by Miller and Lux as a means to reduce depredation of crops by waterfowl.

Before construction of the Central Valley Project, surface irrigation facilities in the Drainage Problem Area were largely limited to San Joaquin River diversion structures and gravity distribution canals. Groundwater supplies had been developed in many localities above the canal service areas, but were typically of poor quality; severe overdraft caused the water table to drop rapidly and greatly increased the cost of pumping. This meant that high quality, affordable water in the grassland area was generally available only to canal service areas, and then only from San Joaquin River flow; the wetlands received surplus canal water and surface drainwaters. Water was usually most abundant in late fall, winter and early spring; typically, about

80 percent of the water delivered to the wetlands arrived between October and April (Leach, 1960). The natural flows of the river provided irrigation water on a schedule compatible with the needs of wetland waterfowl. Water supplies necessary to irrigate fruit and vegetable crops during the hot, dry summers were undependable and frequently scarce.

After Henry Miller's death the Miller and Lux Corporation began selling lowland pasture and wetlands, which had always been irrigated by surplus and uncontrolled river water, to dairymen, beef cattlemen, and duck hunters. Between 1920 and 1936, 205 parcels containing 44,200 acres were sold without rights to San Joaquin River water, which were retained by the corporation (Jones, et al, 1947); eventually the water rights of 98,234 acres in the grasslands were separated from the land by Miller and Lux. The corporation also retained the right to continue draining surplus waters through these lands to the San Joaquin River, necessary to the company's irrigation operations. Lowland pastures and wetlands without water rights continued to receive surplus river water from the Miller and Lux canal system and uncontrolled river floodwaters; they seemed to have a stable source of free water for an indeterminant number of years.

Then, in 1939, Miller and Lux sold the lowland water rights to the Federal Government's Central Valley Project for storage behind Friant Dam. Acquisition of rights to a firm water supply did not become a serious problem for grassland irrigators until 1944, when the Bureau of Reclamation began storing San Joaquin River water behind Friant Dam for diversion to the southeastern side of the San Joaquin Valley through the Friant-Kern Canal. Development of storage facilities allowed irrigation water administrators to control the volume and timing of water releases, enabling the development of more reliable water supplies for delivery when demanded rather than when they flowed out of the watershed. Surplus waters from the San Joaquin River were suddenly no longer available when it became possible to store them behind Friant Dam for later use.

As Friant Dam neared completion, grassland range operators realized that they were about to lose their water supply and formed the Cattlemen's Water Committee to coordinate efforts to acquire water. Within a month this organization merged with the Gustine Conservation Association and the Grasslands Association, two sportsmens groups, to form the Grasslands Water Association, a mutual water company incorporated for the purpose of contracting with the U.S. Bureau of Reclamation for Central Valley Project water. Legislative provisions of reclamation law directed the Bureau of Reclamation to commit Central Valley Project water to agricultural uses, restricting it to short-term contracts for surplus water beyond the needs of croplands. Aware that surplus water would become unavailable as more cropland served by the Friant-Kern Canal was brought into production, grassland water users began a campaign to acquire a permanent contract for Central Valley Project water (Jones et al., 1947).

Ultimately, lobbying and litigation by the Grassland Water Association lead to a court award of 50,000 AFY of Class 1 water to replace water lost as a result of the exchange agreements with the Central Valley Project. The Grassland Water District was formed in 1954 to succeed the Grassland Water Association and to contract with the Bureau of Reclamation for receipt of its allocation of Central Valley Project water.

Completion of the Delta-Mendota Canal in 1950 provided a supply of high quality irrigation water to farmland adjacent to the service area of the Miller and Lux canal systems. Lands which were formerly undeveloped, dry farmed or reliant upon inferior groundwater became more productive with irrigation water from the Central Valley Project. But, as the total irrigated acreage in the grassland area increased, many growers began to experience problems with rising shallow water tables and soil salinization. The widespread installation of subsurface drains in the 1950s, '60s and '70s helped to lower shallow water tables, leach salts from the soil, and sustain the productivity of agricultural lands. However, the subsurface drainage systems created a large volume of saline drainwater, most of which could not be continuously reapplied to the land without diminishing its productivity. Growers increasingly needed to discharge drainwater from their fields (Parsons, 1959).

Because Grassland Water District's court award of 50,000 AFY of Central Valley Project water was only about one-third of its total water needs, the district actively sought additional water supplies. As more land came under irrigation, and as river flood water became unavailable to wetland water users, surplus agricultural water became an important source of water for wetland habitat. The Grassland Water District gradually acquired an additional 70,000 to 90,000 AFY of agricultural tailwater and drainwater that gradually became available as land areas upslope from the district came under irrigation with water from the Delta-Mendota Canal. As a result, the organization of agricultural drainage water management in the problem area developed around the growing interdependencies between drainers and wetland interests.

For a period of over thirty years, water utility districts in the Drainage Problem Area developed a system of water administration around interdependent interests in the management of agricultural surface and subsurface drainwaters. Three distinct groups of water interests were integrated into this informal administrative organization: draining entities, drainwater receiving entities, and drainwater conveying entities.

Draining entities organize water users who irrigate agricultural land upslope from the wetlands and generate more drainwater than they can use or easily dispose of; draining entities need to export surplus water and salts that destroy the productivity of the soil. Drainwater receiving entities organize water users who manage wetlands for waterfowl habitat and/or animal pasture; districts serving wetlands, anxious to acquire large quantities of water, increasingly came to rely upon agricultural drainwater. Drainwater conveying entities are geographically situated between upslope draining and downslope receiving entities. They own and operate most of the distribution facilities used to manage drainwater quality and physically move it from one place to another. Drainwater conveyors transport drainwater from draining entities to receiving entities as a public service, in conformity with the "good neighbor" rule, and charge only enough to offset operation and maintenance costs related to drainwater conveyance.

Water utilities in the problem area appeared to have succeeded in establishing a sustainable system of agricultural water management that met the needs of local water users. Then, in 1983, waterfowl deaths and deformities at Kesterson Reservoir became linked to high concentrations of selenium in agricultural drainwater. Almost overnight, the focus of cooperative water administration, selenium laden agricultural drainwater, became a toxic threat and liability for area water users.

The specialized division of labor tying many of the water utilities together around interdependent interests in drainwater management was shaken by the sudden development of mutually exclusive interests in avoiding or disposing of agricultural waste water. Draining entities still needed to discharge their surplus agricultural waste waters, but drainwater receivers were unable to use drainwater that threatened the viability of wetland habitat. Drainwater conveyors became reluctant to manage the blending and delivery of potentially toxic water, which might make them liable for damage to public health, wildlife or habitat.

The structure of local water administration was disrupted but not destroyed as circumstances surrounding agricultural water management changed after 1983. Local water administrators continue to recognize interdependent interests in managing agricultural drainwater, and local water utility districts actively involved in drainage issues fall into one of the three drainwater management categories of draining, receiving, or conveying entities.

DRAINING ENTITIES

Draining entities are water users who irrigate agricultural land upslope from the grassland area wetlands and generate more tailwater and drainwater than they can use or easily dispose of; drainers need to export surplus water and salts that destroy the productivity of the soil. The draining entities profiled in this report are the Firebaugh Canal Company, the Broadview and Pacheco Water Districts, and the Charleston and Panoche Drainage Districts.

Firebaugh Canal Company

The Firebaugh Canal Company was incorporated as a mutual water company in 1914 to wheel San Joaquin River water to approximately 22,640 acres of land in northwestern Fresno County. The company's service area is located southwest of the Central California Irrigation District and Mercy Springs Water District, north of Mendota, and northwest of Westlands, Broadview and Panoche Water Districts; Widren Water District nearly bisects the company's service area in a slinder finger of land jutting out just northwest of the boundary between the Broadview and Panoche Water Districts. The 53 landowners in the company's service area hold riparian and appropriative water rights to San Joaquin River Water, which State Water Resources Control Board records show were first used in 1920. Rights to San Joaquin River water is exchanged for Delta-Mendota Canal water under the terms of a 1939 contract with the Central Valley Project. The Federal Government provides a permanent, replacement water supply without cost, and exchange contractors are exempt from the requirements of federal reclamation law. If the Federal Government fails to honor the provisions of the exchange contract, exchange contractors may reassert their rights to San Joaquin River water.

The company distributes water through approximately 47 miles of canals, constructed in 1921 (Blair-Westfall Associates, 1966). Irrigation water delivered southwest of the Delta Mendota Canal is lifted from the Mendota pool into three lift canals. Water used to irrigate land northeast of the DMC is diverted by gravity flow from the Delta Mendota Canal. The company also provides drainwater discharge services for landowners through a system of about 58 miles of surface drains (Camp, 1988). Drainwater flows out of the company's service area through the Firebaugh Main Drain into the Agatha Canal, which takes it into the Grassland Water District. The company operates with a staff of 11 to 13 employees (Fresno County, 1987). Water deliveries from the Central Valley Project to the company averaged 80,173 AFY for the period 1976-1985 (State of California, 1987).

Broadview Water District

The Broadview Water District was incorporated in 1955 in order to contract with the Bureau of Reclamation for deliveries of Central Valley Project water to its 9,515 acres of farmland in northwest Fresno County. The district is bounded by the Panoche Water District on the west, the Firebaugh Canal Company on the north, and the Westlands Water District on the east and south. Broadview Water District employes four maintenance and operations persons, an office person, and a district manager.

Water deliveries from the Central Valley Project to the company averaged 16,882 AFY for the period 1976-1985 (State of California, 1987). Roughly half of the 15 operators in the district rent at least part of their land. District growers oversee operations that range in size from 160 acres to 12,000 acres, including land outside of the district.

Broadview Water District cooperates with the Firebaugh Drainage Association, an informal association organized to arrange for drainage discharge services for the growers in Broadview Water District and operations on about 4,500 acres in the Westlands Water District. The purpose of the association is to arrange for the collection of tailwater and drainwater from land served by the association, mix it with fresh water from the Delta-Mendota Canal, and use it for irrigation in Broadview Water District. Broadview Water District provides the actual drainage services for the association, which coordinates payment for related operation and maintenance costs. However, since the toxic effects of selenium in agricultural drainwater became known, the Firebaugh Drainage Association no longer arranges drainage discharge services to growers outside of Broadview Water District boundaries.

Broadview Water District arranged for the disposal of saline drainwater in 1983 through a 15 year contract with the Grassland Water District. The contract allows Broadview to discharge about 12,000 acre-feet of diluted drainwater (with maximum standards for tds and boron, monitored daily) in exchange for a $47,515 annual fee ($5 per acre). Subsurface drains are metered, and drainwater is sampled every two weeks at a bi-weekly cost of $435 (Cone, 1988). Drainwater flows out of the company's service area through the Firebaugh Main Drain into the Agatha Canal, which takes it into the Grassland Water District.

Pacheco Water District

Pacheco Water District encompasses about 4,600 acres of agricultural lands incorporated in 1976 to contract with the federal government for Central Valley Project water. Most of the district is located in the southwest corner of Merced County, with a small finger of land extending into the northwest corner of Fresno County. The district lies to the west of Panoche Water District, to the east and north of San Luis Water District, and to the south of Central California Irrigation District.

There are three landowners in the district, two owner-operators who farm about 300 acres each and one large landowner who leases land to 13 operators farming parcels that range from about 200 acres to just over 400 acres (Dermer, 1988). Pacheco Water District receives water from the Central Valley Project's Delta-Mendota and San Luis Canals, most of which is delivered by gravity flow from the San Luis Canal (U.S. Bureau of Reclamation, 1987). A minor proportion of the water supplied to the district is provided by the Central Valley Project in exchange for appropriative water rights to San Joaquin River water, the rest is federal contract water (State of California, 1987). There are two full-time employees, two part-time employees, and one temporary employee working for the district. Water deliveries from the Central Valley Project to the company averaged 9,403 AFY for the period 1976-1985 (State of California, 1987). The district has amended its water contracts with the U.S. Bureau of Reclamation to conform with the requirements of the 1982 Reclamation Reform Act (Dermer, 1988).

Pacheco Water District coordinates drainage affairs for all of the land within the district, plus more than 1,200 adjacent acres in the San Luis Water District and the Central California Irrigation District. Between 1955 and 1975, subsurface drains were installed on 3,550 acres of the 5,851 acres of farmland receiving drainage services from the district. The district collects drainwater in the Hamburg Drain and discharges it to the Camp 13 Ditch (State of California, 1987). Pacheco Water District first discharged drainwater into Grassland Water District under the terms of a 1962 contract, which set water quality standards on the basis of total dissolved solids. However, since 1983, concentrations of trace elements in drainge water have become a concern for Grassland Water District. Pacheco Water District is now negotiating a new contract to discharge drainwater with Grassland Water District.

A system of tiered water pricing was adopted by the district in 1988 as a water conservation measure. Instead of charging a flat fee for each acre foot of water delivered, the district charges a variable amount that depends on the total volume of water used and the type of crop grown. Some operators have hired irrigation contractors to assist them in conserving water, at a cost of between $16-$18 per acre.

Charleston Drainage District

The Charleston Drainage district is located in the southwestern portion of Merced County just east of Interstate 5. It encompasses 4,314 acres of agricultural land, overlapping about 3,800 acres of the San Luis Water District and about 500 acres of the Central California Irrigation District. It was formed by drainage district landowners on March 3, 1973 for the purpose of managing subsurface drain and tailwater runnoff from district lands. Subsurface drains have been installed on 1,100 acres in the district. On November 21, 1975, the district entered into a contract with the Grassland Water District to discharge a maximum of 34 cubic feet per second of agricultural drainwater into the Charleston Drain, subject to water quality standards originally set by Grassland Water District (State of California, 1987).

Panoche Drainage District

The Panoche Drainage District, encompassing the land areas of the Panoche, Eagle Field, Oro Loma and Mercy Springs Water Districts south of the Outside Canal, was formed on April 16, 1957 to provide drainage services to district farmers. There are about 43,174 acres within the district, which straddles the Merced and Fresno County lines on the western side of the San Joaquin Valley between interstate highway 5 and State of California highway 33. Approximately 94% of the district lies in Fresno County; the rest, about 2640 acres, are located in Merced County (County of Fresno, 1976).

About 22,000 acres of farmland in the district are drained by subsurface tiles. The drainage district currently has a contract to discharge drainwater into the Grassland Water District for a flat annual fee of $2.88 per district acre, subject to water quality standards set by Grassland Water District (Falaschi, 1988). The district collects drainage in its Panoche Drain, which discharges into the Agatha Canal.

Unless and until a feasible treatment technology.is developed to provide an alternative means of disposal, draining entities will remain dependent upon cooperative relations with drainwater conveying and drainwater receiving entities in order to discharge agricultural drainwater. The certain decline in the productivity of agricultural land irrigated with recycled saline drainwater has been well documented (Wichelins, Nelson and Weaver, 1988).

DRAINWATER RECEIVING ENTITIES

Drainwater receiving entities manage wetlands for waterfowl habitat and/or animal pasture. Districts serving wetlands identify the acquisition of an adaquate supply of good quality water as their most pressing problem. Some sources of agricultural drainage produce substantial volumes of usable water if properly managed. The drainwater receiving entities profiled in this report are the Grassland Water District and the Grassland Resource Conservation District.

Grassland Water and Resource Conservation Districts

The Grassland Water District was incorporated on December 22, 1953 to provide owners of western Merced County wetlands with irrigation water for cattle pastures and waterfowl habitat. The district is located between the Delta-Mendota Canal and the San Joaquin River, bisected into northern and southern portions by state highway 152, and lies southeast and north of the City of Los Banos. It encompasses 51,322 acres, 30,528 in the northern section and 20,794 acres in the southern section. The water district lies almost entirely within the Grassland Resource Conservation District.

Grassland water users are mainly engaged in the grazing of livestock, the management of waterfowl habitat, or a combination of both. Livestock grazing was the principal activity in the district upon formation, utilizing about 60% of the district's land area. Today grazing is carried out on about 17% of the district's land, and habitat management accounts for the rest (Lower, 1988).

Wetland management in the district is mainly provided by private land owners. Land companies and duck clubs own most of the land area served by the district. Management strategies of individual water users correspond with landowners' interest in waterfowl, interests in revenue production, and available financial resources. Landowners with financial resources and an interest in waterfowl usually manage for food production, cover, and brood habitat. Those less interested or less financially able tend to flood only to attract ducks during the hunting season or to produce grasses to graze cattle, in effect managing to produce hunting or grazing revenues (Jones and Stokes Associates, 1985).

Land ownership patterns differ between geographic areas within the district. In the northern portion larger holdings and corporate ownership patterns predominate, while in the southern portion small holdings by individuals and partnerships are the norm (Campell, 1987; Cook,1988). There has been a trend toward absentee ownership in the district as costs have outstripped the ability of some local owners to pay. Individual owners are having increasing difficulty in managing wetlands as they become geographically separated from their land. At the same time government programs to encourage management practices for habitat enhancement require a substantial investment in time and professional expertise. As a result, increasing numbers of landowners are turning to professional managers, who often manage the land of several gun clubs or land companies (Cook, 1988).

Grassland Water District, which takes primary responsibility for the administration of water utility services, cooperates closely with the Grassland Resource Conservation District. The Grassland Resource Conservation District was formed on March 10, 1959 in order to provide water and soil conservation services to district water and land managers. Grassland Resource

Conservation District encompasses about 75,000 acres, overlapping most of the area of the Grassland Water District. Water users in the Grassland RCD include privately owned duck clubs, land and cattle companies, two state wildlife management areas, and one national wildlife refuge. According to the Grassland Resource Conservation District's 1986 Annual Report, approximately 63,000 acres in the district are floodable habitat, representing between 20% and 25% of the remaining wetlands in California's Central Valley. The area provides important wintering habitat for migratory waterfowl of the Pacific Flyway.

Grassland Resource Conservation District provides an organizational structure through which private associations and state and federal agencies assist Grassland Water District land and water managers with funding, research and management services. The federal government operates three federal programs in the Grassland RCD. The Federal Easement Program, administred by the U.S. Department of the Interior, buys, in perpetuity, the agricultural development rights to land, barring development of wetland habitat for agricultural purposes. The federal Water Bank Program is administered by the Soil Conservation Service to offset the expense to private managers of providing water, nesting and feed habitat for wintering waterfowl. The federal cost sharing program is offered by the Agriculture Stabilization and Conservation Service; its purpose is to provide matching funds for soil conservation projects, often encouraging the construction of irrigation or drainage facilities needed for habitat management purposes (Campbell, 1987).

The welfare of grassland area drainwater receiving entities is inextricably linked to cooperative relations with drainwater conveying entities. Grassland Water District and Grassland Resource Conservation District lack the water conveyance facilities necessary to duplicate water management services provided by conveyors. While there are no rigorous estimates of the probable costs of constructing separate conveyance facilities, knowledgeable observers agree that it would run into many millions of dollars and substantially increase operation costs to district water users.

DRAINWATER CONVEYING ENTITIES

Drainwater conveying entities own and operate the infrastructure necessary to manage drainwater quality and to physically move it from one place to another. The Central California Irrigation District owns or operates many of the facilities used for transporting agricultural wastewaters between water utility districts in the grassland area. Althought the San Luis Canal Company cooperates with the U.S. Fish and Wildlife Service, through common membership in the Grassland Water Task Force, to provide temporary, non-toxic drainwater conveying services to the San Luis Island National Game Refuge, the company has repeatedly stressed its intention to withdraw its services as soon as additional water works can be constructed and operated by other water utilities. Other districts and canal companies who transport drainwater in the grassland area provide the service primarily for individual drainers within the district

Central California Irrigation District

Central California Irrigation District extends approximately 70 miles through western Fresno, Merced and Stanislaus Counties, from Mendota in the south to Patterson in the north. The district shares boundaries with nearly every other water utility district and community in the Grassland Study Area. The district was formed on November 11, 1951 to acquire the water distribution facilities of the San Joaquin and Kings River Irrigation and Canal Company, which had served grassland area lands holding riparian and appropriative water rights on the San Joaquin River since the late 1860s. District landowners exchange San Joaquin River water for Delta Mendota Canal water under the terms of a 1939 contract with the Central Valley Project. The Federal Government cannot charge district landowners for Central Valley Project water and they are exempt from most of the provisions of federal reclamation law. If water quantity and quality standards are not maintained by the Federal Government, the exchange contractors may reassert their rights to San Joaquin River water.

Water deliveries from the Central Valley Project to the district averaged 502,164 AFY for the period 1976-1985 (State of California, 1987); the district also pumps an additional 25,000 AFY of groundwater (Latham, 1988). CCID delivers water to roughly 1,800 water users within district boundaries who irrigate approximately 145,000 acres of cotton, alfalfa, corn, orchards, beans, melons and other crops (U.S. Bureau of Reclamation, 1986a). There are about 5,000 acres of agricultural lands in the district with subsurface drains. Approximately 1,500 acres are located just north of the boundary with the Firebaugh Canal Company and discharge into the Firebaugh Main Drain, which disharges into Grassland Water District through the Agatha Canal. The district collects subsurface drainage from another 3,500 acres located north of the Charleston Drainage District in the Almond Drive Ditch, which discharges into Grassland Water District through the Camp 13 Ditch. Eighty employees maintain and operate the district's hundreds of miles of canals and other facilities. In 1987 the district also assumed responsibility for operations and maintenance of the lower segment of the Delta Mendota Canal from the U.S. Bureau of Reclamation.

Because drainwater conveying utilizes the same system of works as water wheeling to district water users, CCID is involved in contracting and scheduling of deliveries between the draining entities and drainwater receiving entities. CCID also monitors drainwater quality for grassland area draining entities (except for Panoche Water District).

CONCLUSIONS

In the grasslands, water utility districts serve as a focal point for agricultural water policy, planning, and day-to-day management. Agricultural drainage problems, concentrated in particular areas of the grasslands, create problems that affect irrigated agriculture and water management practices in some districts more than others. Water utility districts responsible for water management in the Drainage Problem Area have taken an active role in formulating policies to address drainage-related issues. These water utility districts cooperate with each other, providing important organizational linkages among water users, water managers, and other governmental entities in the region.

The centrality of water management organizations in shaping water use decisions in the Problem Area of the grasslands suggests the importance of considering the organizational context of water management when formulating plans to change current irrigation and drainage practices. Clearly, plans intended to alter current patterns of agricultural water use and management must be evaluated, in part, through careful consideration of the part that organizations play in shaping, adopting or rejecting proposals for change in the area. Plans that assume that individual farm operators act largely as autonomous decision makers, guided solely by a desire to maximize individual self-interests, will be seriously flawed and may be rejected by area water users as irrelevant in dealing with their "real-world" problems. Actual water management practices in the grasslands are frequently negotiated settlements among interdependent actors who cooperate with each other over extended periods of time.

Equally important in formulating and evaluating plans that propose to change the existing organization of irrigation and drainage management in the area is a careful consideration of formal and informal arrangements and understandings which shape and organize water use decisions. The organization of agricultural drainwater management in toxic drainwater problem areas of the Drainage Problem Area is best understood as a system in which formal organizations fall into distinct, interdependent catagories, depending upon their specialized role as drainwater generators, conveyors or users.

REFERENCES

Association of California Water Agencies (ACWA)
1985 ACWA's 75-Year History: 1910-1985, Association of California Water Agencies, Sacramento, Ca.

Blair-Westfall Associates
1966 Land Subsidence in the Firebaugh Soil Conservation District.

California Department of Water Resources
1978 General Comparison of Water District Acts, Bulletin 155-77.

California State Controller
1987 Annual Report of Financial Transactions concerning Special Districts of California, 1985-86.

Campell, Mark
1987 A Report on Wetland Ownership and Recreational Use in the Grasslands Water District and Refuges of the Central San Joaquin Valley.

Capehart, Robert
1988 San Luis Canal Company. Personal Communication.

Cone, Dave
1988 Broadview Water District. Personal Communication.

Cook, S.
1988 Grassland Water District. Personal Communication.

County of Fresno
1976 Spheres of Influence Report for Regional Special Districts, prepared for the Fresno County Local Agency Formation Commission.

Dermer, David
1988 Pacheco Water District. Personal Communication.

Falaschi, D.
1988 Panoche Water District. Personal Communication.

Fresno county
1987 Petition for the Formation of the Firebaugh Canal Water District.

Goodall, Merrill R. and John D. Sullivan
1979 "Water District Organization: Political Decision Systems," in California Water Planning and Policy: Selected Issues, Ernest A. Engelbert (ed.), University of California.

Grassland Resource Conservation District
1986 Annual Report.

Jones and Stokes Associates
1985 Draft Ecological and Water Management Characterization of Grassland Water District.

Jones, Phillip E., J.B. Hammon, and L.B. Christiansen
1947 Land and Water Utilization in the Westside Grasslands Area of San Joaquin Valley, United States Department of the Interior, Bureau of Reclamation.

Latham, Walt
1988 Central California Irrigation District. Personal Communication.

Leach, Howard R.
1960 "The Wildlife and Fishery Resources in Relation to Drainage Problems in the San Joaquin Valley," in The Grassland Water Summary, Jayne Philpott Casey (ed.), Grassland Water District, Los Banos, CA.

Lower, R.
1988 Grassland Water District. Personal Communication.

Mac Cannell, Dean
1987 Final Report on the Structure of Agriculture and Social Conditions in Rural Communities, San Joaquin Valley Drainage Study Area, Macrosocial Accounting Project, University of California, Davis.

Mendoza, T.
1988 Broadview Water District. Personal Communication.

Meyer, John W. and Brian Rowan
1977 Institutionalized Organizations: Formal Structure as Myth and Ceremony, American Journal of Sociology, 83(2):340-363.

Parsons, M. Ray
1959 The Firebaugh-Los Banos Drainage Survey, USDA-SCS.

Porter, Mike
1988 Central California Irrigation District. Personal Communication.

San Luis Canal Company
1987 Annual Report to Stockholders.

State of California
1979 California Water Atlas.

State of California
1988 Data Base Report, State Water Quality Control Board, Division of Water Rights.

State of California
1987 Regulation of Agricultural Drainage to the San Joaquin River, Appendix G, Volume 1, State Water Resources Control Board.

Sokolow, Alvin D., Priscilla Hanford, Joan Hogan and Linda Martin
1981 Choices for the Unicorporated Community, Institute of Governmental Affairs, University of California, Davis.

Treadwell, Edward F.
1981 The Cattle King, Western Tnager Press, Santa Cruz, CA.

United States Bureau of Reclamation
1986a Crop Production Reports.

United States Bureau of Reclamation
1986b Agricultural, Municipal and Industrial Water Reports.

United States Department of the Interior
1958 Factual Report: Broadview Water District.

Wichelins, Dennis, Daniel Nelson and Thomas Weaver
1988 Farm Level Analysis of Irrigated Crop Production in Areas with Salinity and Drainage Problems.

P00001893